Sites Reservoir

Frequently Asked Questions

How much will it cost to build and operate the reservoir (including the costs of relocating infrastructure)?

The total project cost is estimated at $2.06 to $3.01 billion depending on conveyance options. The annual costs for operations, maintenance and power are estimated at $10 to $21 million. These estimates are based on preliminary feasibility studies and include all capital costs for construction, engineering, administration, environmental compliance and mitigation, legal, real estate and contingencies.

What are the identified benefits?

Sites Reservoir will add flexibility to the state's current water management system and can provide unique benefits which include:

- Enhanced water supply reliability for urban, agricultural, and environmental uses
- Improved Delta water quality
- Mitigation of snowpack storage losses due to climate change
- Contribute to flood damage reduction in the Central Valley
- Ecosystem restoration actions in the Sacramento River
- Dedicated storage that can be adaptively managed to respond to Delta emergencies and help with restoration actions
- Identified benefits are continuing to evolve and will depend on the partners' needs

Are Sites Reservoir and Temperance Flat Reservoirs the best location for surface storage?

Sites Reservoir and Temperance Flat are among the best locations for surface storage. Since the late 1990s, state and federal agencies have investigated five promising surface storage projects. Each project is capable of producing multiple benefits. Sites Reservoir and Temperance Flat are the largest projects and will produce the broadest array of statewide benefits. These conclusions are based on the following facts:

- State and federal agencies initially screened 52 potential surface storage sites

- Many locations were eliminated because of high environmental impacts and costs
- Five surface storage sites were selected for further study (Shasta Lake Enlargement, Sites, Reservoir, In-Delta Storage, Los Vaqueros Reservoir Expansion, Millerton Lake Enlargement)
- Sites and Temperance Flat Reservoirs, due to their locations and sizes, would provide the largest and broadest benefits (water supply, water quality, ecosystem restoration, and flood management) from a state and regional/local perspective when compared with the other three.
- Sites and Temperance Flat Reservoirs have significant local and regional support

How quickly can new surface storage be brought on line?

After appropriation of state and federal funds, there will be a two-year design phase followed by a five to seven-year construction phase, for a total of seven to nine years. Current planning schedule would have Sites Reservoir operating by 2019.

What is the impact on the environment?

Sites is an offstream reservoir that will primarily inundate grassland currently used for cattle grazing. Water for the reservoir will be diverted from the Sacramento River. Key areas of concern include effects to cultural resources and effects of winter diversions on anadromous fish species and the Sacramento River flow regime. While the proposed project contains substantial fisheries enhancements (e.g. replacing the Red Bluff Diversion Dam with state-of-the-art fish screens and pumps, and increasing the Lake Shasta cold water pool), it does include modifications to the Tehama Colusa Canal Authority and Glen Colusa Irrigation District intakes, and a new diversion opposite Moulton Weir. DWR and Reclamation are in consultation with the fish and wildlife agencies (Fish and Wildlife Service, NOAA Fisheries (NMFS), and California Department of Fish and Game) regarding any state and federal threatened and endangered species that may be affected. An Environmental Impact Report/Environmental Impact Statement is being prepared to fully identify environmental impacts and mitigation measures. All significant adverse impacts will be mitigated or avoided where feasible.

How could surface storage assist in “saving” the Delta?

Surface storage is one component of a broad array of water management tools that includes conveyance improvements, water conservation and recycling measures, conjunctive management and groundwater storage, reoperation of

existing reservoirs, water transfers, and other actions needed to build a solution to save the Delta.

Additional surface storage will provide flexibility to the state's constrained water management system, which can be operated to contribute to the long-term sustainability of the Delta ecosystem, maintain water quality and supply reliability, and prevent and plan for catastrophic failure of the Delta system. Flexibility within the water management system will likely prove to be essential in developing solutions to Delta ecosystem challenges. With additional capacity and integrated operations, water diversion and deliveries can also be timed in ways that will allow for better response to the effects of earthquakes, floods, and climate change.

Added flexibility from storage can also improve the viability and effectiveness of water exchanges and transfers. Storage dedicated to Sacramento River restoration actions could be adaptively managed to support restoration actions in the Delta if state and federal fishery and wildlife managers agree on their priority. The health of the Delta also depends on the health of its tributaries. Improving conditions on the Sacramento River, the Delta's largest tributary, cannot be ignored when considering Delta improvement measures.

How will water from Sites Reservoir be moved through the Delta?

Department of Water Resources' studies indicate that Sites Reservoir will provide significant benefits under any likely long-term Delta conveyance option that provides a stable Delta export capability. Preliminary operations studies indicate that Sites Reservoir will perform at a similarly favorable level with existing conveyance or enlarged conveyance. Future studies will be done to further evaluate the performance of Sites Reservoir with an isolated facility.

What is the cost of the water? How much more does it cost to get it over the Tehachapi's?

Based on a preliminary cost allocation for one possible project formulation, water from Sites Reservoir will have an average cost of approximately $340 per acre-foot. Transportation costs an additional $140 to $150 per acre-foot to pump the water over the Tehachapi's. However, it should be noted that the project can also provide many other benefits, including water quality and ecosystem restoration flow benefits whose costs are not allocated in this manner and do not require any additional conveyance costs.

If surface storage is part of the overall solution to California's water supply needs, what are the priorities among all of the options available (e.g. conservation, recycling, etc.)?

As California faces mounting water management challenges, including population growth, climate change and water quality degradation, it must invest in a diversified portfolio of water management options, as described in the California Water Plan Update, that include conservation, recycling, desalination, water transfers, reoperation of existing reservoirs, groundwater management, and new surface storage, to deal with these challenges. No single water management action can meet all of California's future water management challenges.

New surface storage can also add to reliability at a lower total cost than the highest cost water recycling and water conservation options that would be needed for the most economically efficient future urban water management strategy.

Other cost effective alternatives exist. Why is the state looking at surface storage?

California needs to implement a full array of different water management actions. Each contributes in different ways to the overall reliability of the water management system. Water conservation, water recycling, watershed management, conveyance, desalination, water transfers, groundwater storage, and surface storage are all needed in a diversified management portfolio. Water conservation, one of the most cost effective actions, needs to be aggressively pursued in conjunction with surface storage and other actions. Surface storage provides a degree of operational flexibility that cannot be provided by other management actions. Surface storage is particularly useful in providing drought protection, releasing water at specific times for water quality and environmental benefits, contributing to flood management, mitigating for lost snowpack due to climate change, and responding to other unforeseen circumstances.

How can decisions on surface storage be made without final studies that better define project costs and benefits?

Existing surface storage studies already provide a wealth of information that can be used as the basis of implementation decisions on locating new storage. Since the late 1990s, state and federal agencies have performed detailed studies that have focused on five promising surface storage projects. This information has been published in a series of documents that can be found on the DWR and Reclamation project websites. The studies have determined estimated project costs and have shown that each potential surface storage project can be

operated in a variety of ways to achieve a range of different benefits depending on the objectives of the project partners. The studies have also identified potential environmental impacts, including biological and cultural resources that may be affected. Impact analyses and mitigation will be included in the environmental documents and permits.

Reports and summaries of these studies provide potential partners, including the state and federal governments, sufficient information to evaluate their level of interest in each project. Feasibility study reports and environmental impact reports/environmental impacts statements will be completed for Sites Reservoir by the end of 2008 and for Temperance Flat in 2009. The final studies should include input from project partners so final costs and benefits can be determined.

Final decisions on project implementation will be made after the studies are completed and the projects are deemed feasible.

Why aren't project partners (beneficiaries) stepping up to pay for the water supply benefits from the storage projects?

While potential project partners have been engaged in the storage investigations, none have yet committed to investing in the projects. Both Sites Reservoir and Temperance Flat are likely too large for any one agency or entity to pursue on its own. Partnerships, including state and federal participation to pay for broad public benefits, are necessary to allow groups of entities to share in project costs and benefits.

The ongoing feasibility studies will help define the cost sharing by state and federal agencies, but more is needed to provide assurances for other potential partners. A framework for investment, similar to that included in Senate Bill 59, would define the state's cost share in the Sites Reservoir and Temperance Flat projects and demonstrate to potential partners that the state government is serious about substantially participating in the projects. Based on this initial framework, cost sharing for these public benefits may pay up to one-half of the project costs, leaving the remainder to be paid by other project beneficiaries.

In addition, until now, there has been no framework for a fix for the Delta, which potential project participants may find critical to assuring that they could realize benefits from surface storage. The Governor's Delta Vision initiative, the Bay Delta Conservation Plan, the Delta Risk Management Strategy, and other initiatives including provisions of SB 59 demonstrate that the state is serious about fixing the Delta. Surface storage needs to be developed in light of a Delta solution and as part of a comprehensive plan for securing statewide water reliability.

What is the estimated yield of the project?

The estimated total average annual yield of Sites Reservoir, from 2007 operation studies, ranges from 470,000 to 640,000 acre-feet per year. These yields include water supply benefits for urban, agricultural and environmental uses, water quality, and ecosystem restoration (flow) actions.

Will the existing Red Bluff Diversion Dam be used to divert water to Sites Reservoir?

No. Water will be diverted directly from the Sacramento River using screened pumps. The dam will not be needed to operate the Tehama-Colusa Canal or to fill Sites Reservoir.

Will Sites Reservoir divert most of the flow in the Sacramento River during the time when the reservoir is being filled?

Preliminary operations studies indicate that the average monthly Sacramento River flow diverted at Red Bluff (Tehama-Colusa Canal) ranges from 3.02 to 15.13 percent, at Hamilton City (Glenn-Colusa Irrigation District Canal) ranges from 0 to 5.83 percent, and at new diversion location opposite Moulton Weir ranges from 0 to 4.37 percent. The maximum monthly average diversion at any of the three locations is 35.8 percent. Flows remaining in the river would be more than the flows needed to meet all existing regulatory and diversion requirements in the river and the Delta.

Will Sites Reservoir impede salmon migration?

Currently, the Red Bluff Diversion Dam (RBDD) impounds water from about May 15 through September 15 each year for the irrigation season. This impedes the migration of adult spring-run Chinook salmon (federal and state listed as Threatened), completely blocks part of the spawning run of adult green sturgeon (federally listed as Threatened), and affects the outmigration of juvenile winter-run Chinook salmon (federally and state listed as Endangered) and juvenile green sturgeon. In addition, it is unknown how this dam affects the River Lamprey, a California Species of Special Concern.

The Sites Reservoir project includes the addition of state-of-the-art fish screens and pumps at the Tehama-Colusa Canal diversion. The RBDD barrier will no longer be necessary. This should improve conditions for anadromous fish, as well as resident native fish species in the Sacramento River.

In addition, Sites Reservoir will deliver water directly to the local services areas below Funks Reservoir. This will help improve fish passage by reducing diversions from the Sacramento River at Red Bluff (through the Tehama-Colusa Canal) and Hamilton City (through the Glenn-Colusa Irrigation District Canal) during critical fish migration periods. Sites Reservoir, through integrated operation with Shasta Lake, can also provide stable flows in the fall and winter between Keswick and Red Bluff to avoid abrupt reductions. This will avoid adverse conditions for spawning fall-run Chinook salmon.

How many years of hydrologic data are being used for the analyses?

The operations studies use 82 years (from 1922 to 2003) of hydrologic record. In addition, the investigation includes sensitivity analyses that vary these flows to test the possible effects of climate change, such as more winter precipitation falling as rain and less as snow.

How is evaporation being taken into account?

Evaporation for all reservoirs, including Sites, is accounted for in the operations studies. Evaporation rates are directly related to the exposed surface area in a reservoir and wind and temperature conditions. Preliminary operations studies for Sites Reservoir show the total average annual net evaporation ranges from 25,000 to 30,000 acre-feet per water year which is approximately 4 to 7 percent of the total average annual yield of the project. These loss rates are comparable to loss rates associated with groundwater projects.

Won't equipment used during the construction of Sites Reservoir contribute to global warming?

Preliminary estimates are showing that the years required to construct the earth-filled dams for Sites Reservoir, enlargement of the forebay, and the construction of a 14 mile pipeline would produce less CO2 than all passenger cars commuting in the Los Angeles basin currently produce in two days. However, an evaluation of any reservoir must consider all the potential benefits, costs, and impacts.

Will Sites Reservoir contribute to global warming with the use of more electricity (with pumping)?

Sites Reservoir will use more electricity than it will produce. The project will recover only about 75 to 80 percent of the energy that it uses. Assuming natural gas powered supply for water pumping operations, the pumping for Sites Reservoir would annually only produce CO2 emissions equal to about 1 ½ days

of all passenger cars commuting in the Los Angeles Basin. As required, an evaluation of all the potential benefits, costs and impacts will be completed. Most other water management actions are also net users of energy. Sites Reservoir will generally pump water in the winter and spring when energy in the state is more abundant and demand is lower. Water will be released during the summer and fall when the demand is higher. Pumping water into Sites Reservoir creates a more constant energy demand that provides opportunities to couple with wind power sources throughout the state power grid. This so-called wind-shaping could provide a cleaner renewable source of energy for Sites Reservoir pumping operation while the hydropower developed in the summer will offset the use of other greenhouse gas emitting power supplies in the state.

Don't reservoirs also release methane and CO2?

Yes, however it is considered to be relatively small. For example, Lake Oroville, which is approximately twice the size of the proposed Sites Reservoir, would annually emit the same amount of CO2 as one-half day of all passenger cars commuting in the Los Angeles basin. Sites Reservoir, which would be located in an area of grasslands that grow and decompose annually, should produce a much smaller amount of methane or CO2 due to inundation.

Will there be a net decrease in stream flow because of climate change? If so, how will new reservoirs fill?

Climate change projections for changes in total annual precipitation in California through the end of this century are mixed. While models predicting smaller increases in temperature tend to predict moderate increases in precipitation, models predicting the greatest amount of warming predicted moderate decreases in precipitation. All models, however, projected changes in timing, amount of precipitation, and runoff. In addition, most temperature projections indicate that higher temperatures will result in higher snow elevations, and more precipitation will fall in the form of rain rather than snow which will increase winter inflows to existing reservoirs. Therefore, more annual runoff will likely be passed through the existing reservoirs in the winter. New reservoirs would improve our ability to capture this modified winter runoff and mitigate the loss of snowpack storage.

California will use less water in 2030 than today (i.e., Water Plan) through urban conservation and recycling with off-the-shelf technology. Why do we need additional water storage?

The Water Plan presents three future scenarios. These scenarios are "plausible futures, not forecasts." The scenarios are instead intended to describe a methodology approach to future water Update comparisons of both supply and

demand. The net change in statewide demand varies from a slight decrease to an increase of about 4 MAF per year between now and 2030. However, these estimates do not account for a continued overdraft of about 2 MAF per year from groundwater basins. If correction for groundwater overdraft is considered, the net demand increases from about 2 to 6 MAF per year by 2030.

The Water Plan Update states, “a big challenge now and for the future is to make sure water is in the right places at the right times. Challenges will be greatest during dry years.” Surface storage is a measure that provides the flexibility to place water in the right place at the right time by optimizing the timing of releases to maximize water supply benefits. Both water demand and shortages occur in specific places at specific times. Multi-year droughts present the greatest challenge for water managers, because water in storage is diminished during each successive dry year. Looking at the total change in water demand for the State, while informative, is less essential than understanding a water system’s ability to reliably deliver water supplies to a service area during drought conditions.

McCloud River is a designated scenic river. Wouldn’t Senate Bill 59 overrule that designation?

No, Senate Bill 59 does not propose to change the wild and scenic protection of the McCloud River.